

5:5:1 Counting and Permutations

Name _____

Erin earned enough babysitting money to buy herself an i-Pod and a docking station. When she went to the store, she had to choose what color i-Pod to buy and what type of docking station to play it on. The store Erin went to had i-Pods in silver, green, blue and pink. They had 2 different docks in Erin's price range, and Jensen and a Sony.

1) Make a tree diagram that shows how many combinations of an i-Pod with a dock Erin could purchase.

2) How many colors did Erin have to choose from?

3) How many docking stations did Erin have to choose from?

4) How many combinations were possible?

5) Do you see any relationship between the number of choices and the number of outcomes?

6) The relationship you just discovered is called "The Counting Principle". Take out your Math Dictionary and define The Counting Principle in it.

7) Use the Counting Principle to figure out the following problem.

Ruffin had 2 pairs of jeans, a pair of khakis, and a pair of wind pants. He had a hoodie, a long-sleeved tee, and a jersey. Ruffin, being the fashion-conscious guy that he is, wanted to top his outfit off with a hat. He had 3 baseball caps, 2 winter caps, and a cowboy hat to choose from. How many different outfits could Ruffin put together with these clothing items? Show your work using the Counting Principle.

Jack needed to put a password on his email account. He decided to use an arrangement of the letters in his first name.

8) How many choices are there for the first letter in an arrangement of the letters in JACK?

9) After the first letter has been chosen, how many choices are there for the second letter?

10) After the first and second letters have been chosen, how many choices are there for the third letter?

11) After the first, second and third letters have been chosen, how many choices are there for the fourth letter?

13) Use the Counting Principle to find the number of different arrangements in of the letters in JACK.

14) Define "Permutation" in your Math Dictionary. The mathematical notation for a permutation like Jack's password would be $4!$ ($4!$ means $4 \cdot 3 \cdot 2 \cdot 1$)

15) Find the number of permutations in each word.

a) BOY

b) WATER

c) OLYMPICS

d) JETSKI

Remember that with Permutations, **ORDER MATTERS!!!** With that in mind, use what you know about permutations to help you solve the following problems.

16) Mr. Elertson sponsored a 5K run. Mrs. Trendel, Mrs. Bachofen, Mrs. Koenig, Mrs. Lemberger, Mrs. Zeka and Mr. Sievert all decided to run in it. In how many different orders could the teachers finish the race?

17) Mrs. Bachofen loves cereal! If she has 9 different boxes of cereal in her pantry, how many different ways could she arrange the boxes on the cereal shelf?